Conducting Contact Investigations for Tuberculosis

July Epi-Tech Training

Lakisha Flagg, MAJ, AN
USAPHC, Army Public Health Nursing Staff Officer

Learning Objectives

- Define a TB contact interview/investigation
- Determine when to initiate a contact investigation
- Review of TB Contact Investigation Procedures (“10 Steps”)
  - Identify relevant information sources
  - Estimate period of infectivity
  - Interview Case
  - Develop plan for investigation
  - Refine estimates
  - Prioritize contacts
  - Conducting field visits
  - Conduct contact interviews
  - Interview expansion
  - Process evaluation
- Describe basic communication requirements
- Describe data collection process and goal of data management

What is a TB Contact Interview/Investigation

- Systematic process of case/contact:
  - Identification
  - Assessment
  - Treatment

<u>Purpose</u>

- Interaction with suspected or confirmed TB cases
- Information gathering, education, and knowledge reinforcement
- Essential component of TB control
- Identification and treatment of contacts
- Facilitate prevention of TB transmission

Components of a TB Contact Investigation

- Pre-Interview
  - Data collection
  - Establish priority of interviews
  - Determination of infectious widow
- Interview
  - Continued data collection/contact identification
  - Assessment
  - Education
  - Collaboration
- Follow – Up
- Ongoing Collaboration & Process Evaluation

Deciding When to Investigate

- Investigate:
  - Confirmed cases of infectious form of TB (e.g., pulmonary or laryngeal)
  - Suspected TB cases, before confirmation
  - Suspected TB cases with negative sputum smears
    - Case has positive chest x-ray (CXR)
  - Suspected TB cases with negative sputum smears, identified during outbreak investigation

- Contact Investigation GENERALLY not required when:

-Noninfectious forms of TB disease

-Cases younger than 10 years of age (Source Case Investigation)

-*Defer to local policy when making determination to investigate

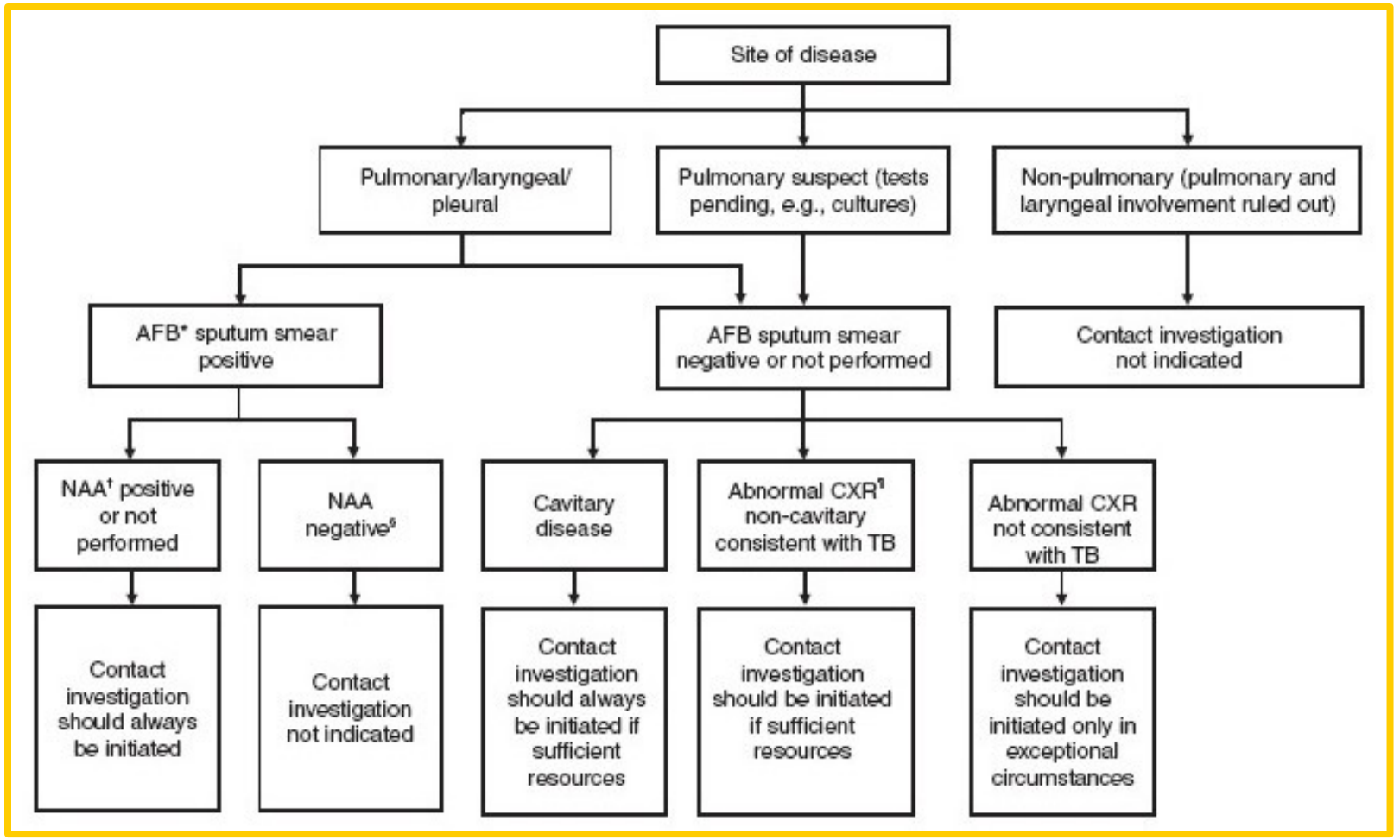
When to Investigate (cont.)

- Highest Priority:
  - Highly infectious
  - Symptomatic
  - Settings conducive to transmission
  - High risk for rapid development of TB disease
    - Weakened immune systems
    - Children younger than 5 years old

- Critical considerations:
  - Resources
  - Concurrent high-priority taskings

- Investigation of contacts with minimal findings to support TB diagnosis is not recommended.

CDC Contact Investigation Algorithm


Site of disease
Pulmonary/laryngeal/ pleural
Pulmonary suspect (tests pending, e.g., cultures)
Non-pulmonary (pulmonary and laryngeal involvement ruled out)
AFB* sputum smear positive
AFB sputum smear negative or not performed
Contact investigation not indicated
NAA† positive or not performed
NAA negative§
Cavitary disease
Abnormal CXR¶ non-cavitary consistent with TB
Abnormal CXR not consistent with TB
Contact investigation should always be initiated
Contact investigation not indicated
Contact investigation should always be initiated if sufficient resources
Contact investigation should be initiated if sufficient resources
Contact investigation should be initiated only in exceptional circumstances

Source: CDC Investigations of Contact of Persons with Infectious Tuberculosis, 2005

Data Collection
(Pre-Interview Phase)

- Purpose:
  - Focuses investigation effort
  - Assists in development of Interview Plan

- Pre-interview Information Sources:
  - Medical Record
  - Reporting provider
  - Public health records (previous identification of case)
  - Tuberculosis Genotyping Information Management System (TB GIMS)

Infectious Period Determination
(Pre-Interview Period)

Patient Information:

- Disease characteristics/site
- Onset of illness/symptoms
- Names of Contacts
- Exposure locations and recent travel
- Date of treatment initiation/Rx susceptibility
- Lab/Genotype results
- Demographics (including preferred language)
- Concurrent medical conditions (e.g., HIV)
- Potential communication barriers

Estimation of infectious period

- Sputum Smear Positive Cases: 3 months before diagnosis or symptom development
- Symptomatic Sputum Smear Negative Cases: 3 Months “”
- Non-Symptomatic, Negative Smear Cases: 1 Month “”

Estimating the Beginning of the Infectious Period

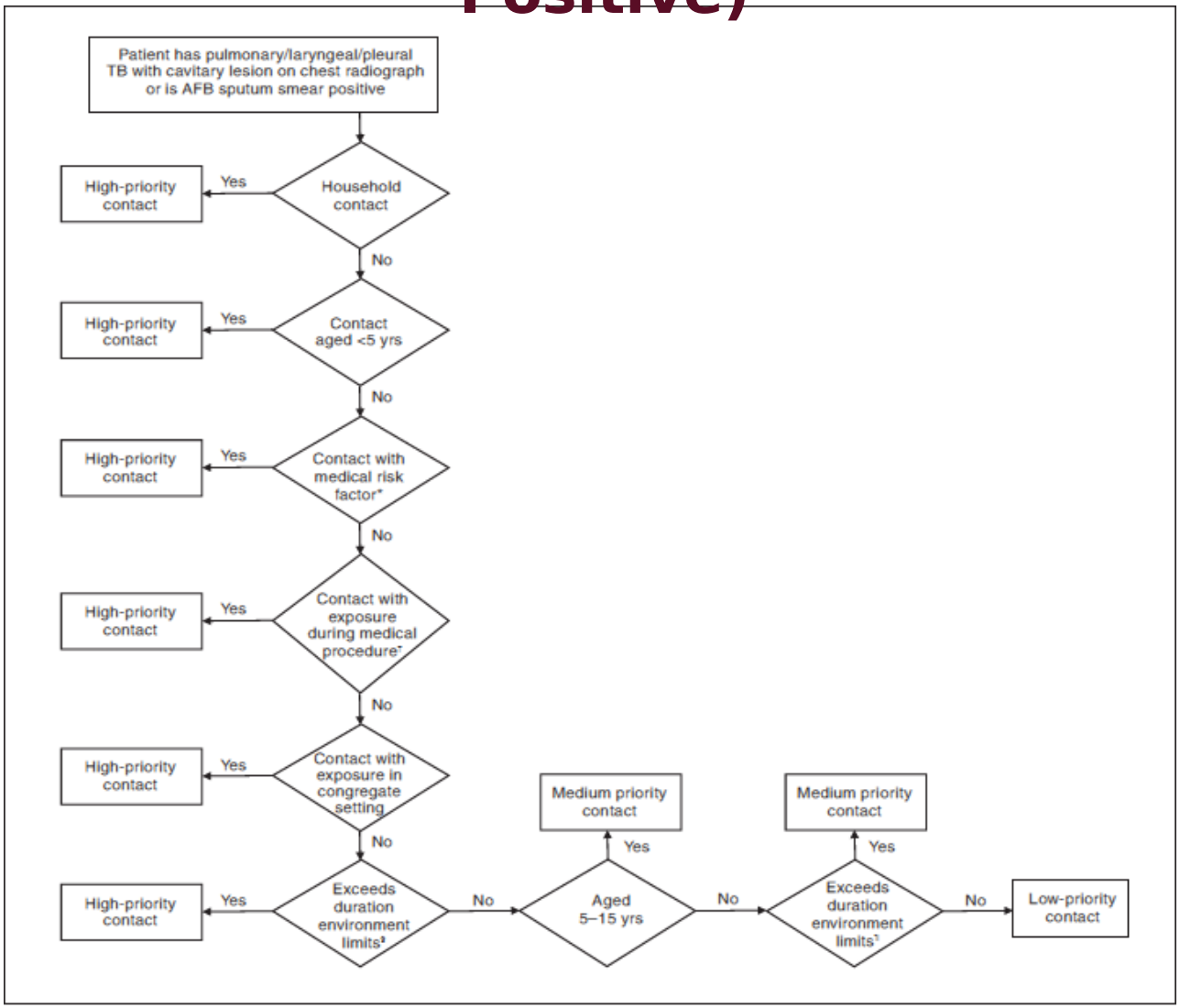
Characteristic of Index Case			
TB symptoms	AFB sputum smear positive	Cavitary chest radiograph	Likely period of infectiousness
Yes	No	No	3 months before symptom onset or 1st positive finding consistent with TB disease, whichever is longer
Yes	Yes	Yes	3 months before symptom onset or 1st positive finding consistent with TB disease, whichever is longer
No	No	No	4 weeks before date of suspected diagnosis
No	Yes	Yes	3 months before positive finding consistent with TB

SOURCE: California Department of Health Services Tuberculosis Control Branch; California Tuberculosis Controllers Association. Contact Investigation Guidelines. Berkley, CA: California Department of Health Services; 1998.

Infectious Period & Prioritization
(Pre-Interview Period)

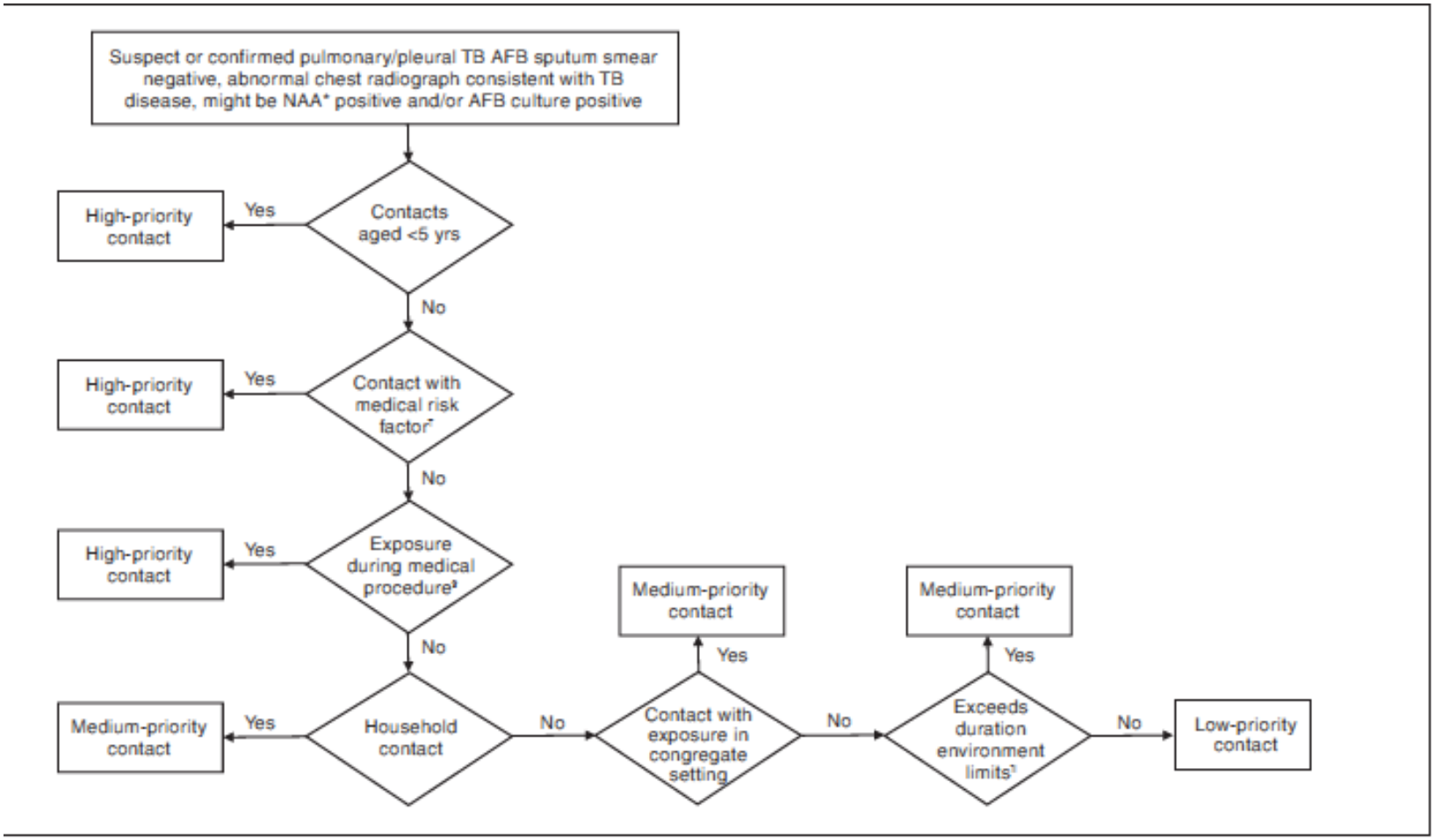
- Criteria for determining the end of the infectious period:
  - Effective Treatment for 2 weeks or more
  - Symptom improvement
  - Bacteriologic Response (3 negative AFB results)
  - Exposure to contacts has ended
- Assigning Priorities to Contacts
  - Exposure
  - Age/Immune Status
- Factors/Degree of Infectiousness

Prioritization of Contacts (AFB Culture Positive)



Source: CDC Investigations of Contact of Persons with Infectious Tuberculosis, 2005

Prioritization (AFB Culture Negative)



Source: CDC Investigations of Contact of Persons with Infectious Tuberculosis, 2005

Factors Associated with Infectiousness

Factor	Description
Clinical	• Presence of cough, especially lasting 3 weeks or longer • Respiratory tract disease, especially with involvement of the larynx (highly infectious) • Failure to cover the mouth and nose when coughing • Inappropriate or inadequate treatment (drugs, duration)
Procedure	• Undergoing cough-inducing or aerosol-generating procedures (e.g., bronchoscopy, sputum induction, administration of aerosolized medications)
Radiographic and laboratory	• Cavitation on chest radiograph • Positive culture for *M. tuberculosis* • Positive AFB sputum smear result

Source: CDC Investigations of Contact of Persons with Infectious Tuberculosis, 2005

Factors for Infectiousness (cont.)

Factor	Description
Concentration of infectious droplet nuclei	The more droplet nuclei in the air, the more probable that *M. tuberculosis* will be transmitted
Space	Exposure in small, enclosed spaces
Ventilation	Inadequate local or general ventilation that results in insufficient dilution or removal of infectious droplet nuclei
Air circulation	Recirculation of air containing infectious droplet nuclei
Specimen handling	Improper specimen handling procedures that generate infectious droplet nuclei
Air Pressure	Positive air pressure in infectious patient's room that causes *M. tuberculosis* organisms to flow to other areas

Factor	Description
Duration of exposure to a person with infectious TB	The longer the duration of exposure, the higher the risk for transmission
Frequency of exposure to infectious person	The more frequent the exposure, the higher the risk for transmission
Physical proximity to infectious person	The closer the proximity, the higher the risk for transmission

Source: CDC Investigations of Contact of Persons with Infectious Tuberculosis, 2005

Interview Timelines

- Index (Source) Case
  - First Interview should be conducted within **ONE** day of reporting
  - Conduct in person
  - Consider contact/safety precautions
    - TB Clinic/Hospital
    - Patient's Home
    - Minimum of TWO interviews (1-2 weeks apart)
- Contact Cases
  - First Interview should be conducted within **THREE** days of identification
  - Highest Priority first
- Site Visits
  - Complete within **THREE** days of initial case interview
  - Allows for verification of findings

Interview Strategies

- Goals are identification of:
  - WHERE infectious period was spent
  - WHAT activities/events case was involved in
  - WHO case spent time with during infectious period

<u>Considerations</u>

- Complete Pre-Interview Activities FIRST
- Determine interview location
- Consider mental and physical condition of interviewee
- Proxy Interviews
- Anticipate and prepare for resistance
- Verify & Clarify
- Reinforce treatment instructions and risk mitigation strategies
- Allow time for questions
- Ensure confidentiality
- Educate

Initial Interviews

- Allows for initial collection of data related to contacts/exposure locations
- Permits face-to-face assessment

- After initial information collected
  - Priority assignments should be reassessed
  - Medical plan for diagnostic tests and treatment determined for contacts (e.g. Army TB Policy, 2013)

- Plan for follow-up Interview (highly recommended)
  - Facilitates Recall
  - Allows for reassessment

TB Interview Checklist

TB INTERVIEW CHECKLIST

Pre-Interview
- Review medical record
- Establish preliminary infectious period
- Develop interview strategy
- Arrange interview time and place

Introduction
- Introduce self
  - Provide identification
  - Explain role in TB control
  - Build trust and rapport
- Ensure confidentiality
- Explain purpose of interview

Information and Education Exchange
- Observe patient's physical and mental state/evaluate communication skills
- Collect/confirm the following information:

Name	Physical description
Alias/nickname	Known exposure to TB
Date of birth	Recent hospitalization for TB
Address	Medical provider for TB
Telephone number	Transportation availability
Next of kin	Other medical conditions
Other locating information	Out patient/DOT plan
	Barriers to adherence

- Assess disease comprehension/provide TB education

New Jersey Medical School National Tuberculosis Center

Information and Education Exchange (cont'd)
- Obtain/confirm TB symptom history
- Discuss basis of patient's current diagnosis
- Discuss disease intervention behaviors (treatment/infection control/medical appointments)
- Refine infectious period/review significance with patient

Contact Identification
- Focus on infectious period
- Explain close and casual exposure
- Stress importance of identification of all close contacts
- Collect information on patient's contacts in the household, workplace, school, other congregate settings, and social/recreational environment including:

Name	Other locating information
Alias/nickname	Relationship to patient
Age/race/sex	Physical description
Address/telephone number	Hours of exposure per week
	Dates of first and last exposure

- Discuss site visits and sharing information on a need to know basis/reinforce confidentiality
- Discuss patient vs. health department method of contact referrals

Conclusion
- Request/answer patient questions
- Review/reinforce adherence plan
- Restate next appointment date (if known)
- Arrange reinterview and home visit (if not already completed)
- Leave name and telephone number
- Thank patient and close interview

Developing a Plan for Investigation

General purpose of Investigation plan:

- Refine estimates
- Prioritize contacts
  - Symptomatic = Top Priority
  - Likelihood of transmission
  - Risk for TB disease development
- Prioritize identified places to conduct field visits

Also consider…

- Development of communication plan for staff
- Clarification of jurisdictional issues
- Methods of investigation, assessment (TST/IGRA)
- Identification of stakeholders
- Potential media interest
- Schedule to review progress/barriers

Notes regarding TST/IGRA Testing

Consider the following CDC guidelines:

- Do NOT retest previous positives
  - Assess for symptoms, previous treatments
- Contacts found to have positive TST/IGRAs should be considered positive for LTBI (>5mm TST Reading = POSITIVE)
- Repeat testing for initial negatives
  - 8-10 Weeks after exposure to case
- Consider Window Period
  - Time between contacts last exposure to case and when TST/IGRA can reliably detect infection
  - 2 to 8 weeks needed for body to mount detectable response to infection

Expanding the Investigation

Conditions for Expansion:

- Achievement of program objectives/plan execution

- Unexpectedly large rate of infection or TB disease
  - TB disease in any contacts who had been assigned low priority
  - Infection in any contacts aged <5 years
  - Contacts with change in TST/IGRA status from negative to positive
  - Higher than expected prevalence of TB infection
    - Calculation of TB Infection Prevalence for contacts
  - Evidence of secondary transmission
  - Local policy

Additional Considerations

- Investigations of:
  - Social and Recreational
  - Hospitals
  - Workplace/School Settings
    - Site Specific
    - Number involved
    - Exposure Duration and Proximity
    - Resources

Data Management

- Management and epidemiologic analysis
- Program evaluation using performance indicators
- Process steps necessary for monitoring timeline objectives
- Assessment/reassessment of investigation strategy

Communication Considerations

- Appropriate language level
- Cultural Awareness/Sensitivity
- Identification and mitigation of communication barriers
- Open-ended questions
- Restate/Summarize
- Demeanor
- Non-Verbal Communication

Confidentiality

- Essential to maintaining credibility and trust
- Constant attention required to maintain confidentiality
- Specific policies for release of confidential information related to contact investigations are recommended
- Informed Consent
- Policies & Training

Concluding a Contact Investigation

Contact Investigation can be concluded if:

- Identified contacts have been assessed
- Contacts with LTBI have completed or are close to completing treatment
- No additional secondary cases of TB among identified contacts are found
- Follow local policy

Next steps:

- Begin ‘after action review’
  - How many contacts identified/treated?
  - How many contacts located, follow ups completed?
  - Appropriate expansion?
  - Training/resource needs? Effectiveness?
  - Follow up plan?

Additional Training

- Essential for successful contact investigations
- Consider collaboration with local health care agencies
- Training Resources:
  - TB101 for Healthcare Workers
    http://www.cdc.gov/tb/webcourses/TB101/intro.html
  - Tools from CDC
    http://www.cdc.gov/tb/publications/eResources.htm

Reference

Content adapted from: *Guidelines for the Investigation of Contacts of Persons with Infectious Tuberculosis: Recommendations from the National Tuberculosis Controllers Association and CDC*. *MMWR* 2005; 54 (No. RR–15)

http://www.cdc.gov/mmwr/pdf/rr/rr5415.pdf

Questions

- **Army:** **USAPHC – Disease Epidemiology Program**
  Aberdeen Proving Ground - MD
  Comm: (410) 436-7605 DSN: 584-7605
  usarmy.apg.medcom-phc.mbx.disease-epidemiologyprogram13@mail.mil

- **Navy:** **Contact your cognizant NEPMU**
  NEPMU2: COMM: (757) 950-6600; DSN: (312) 377-6600
  Email: NEPMU2NorfolkThreatAssessment@med.navy.mil
  NEPMU5: COMM: (619) 556-7070; DSN (312) 526-7070
  Email: ThreatAssessment@med.navy.mil
  NEPMU6: COMM: (808) 471-0237; DSN: (315) 471-0237
  Email: NEPMU6ThreatAssessment@med.navy.mil

- **Air Force:** **Contact your MAJCOM PH or USAFSAM/PHR**
  USAFSAM / PHR / Epidemiology Consult Service
  Wright-Patterson AFB, Ohio
  Comm: (937) 938-3207 DSN: 798-3207
  episervices@wpafb.af.mil